

ULTRIX

Guide to Remote Installation Services

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maynard, massachusetts**

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About This Manual

This manual describes how to install and maintain your remote installation environment using the remote installation services utility, `ris`. Users install software products over the network using the remote installation services area on the server as the distribution device.

New and Changed Information

You can now use the `ris` utility to set up more than one remote installation environment on a server. New functionality like using the `ris` database to manage clients has been added and is described.

Audience

The audience for this manual is anyone installing and maintaining the remote installation environment. The manual assumes that:

- You, or a Digital Field Service representative, have checked the hardware to ensure that it is working properly.
- You have read the Owner's Manuals supplied with your hardware.
- You know the location and function of the controls and indicators on your hardware.
- You understand how to load and unload the installation media and any disks needed during the installation.
- You know how to use ULTRIX software.

Organization

Chapter 1	Overview
	Describes the remote installation environment and introduces the <code>ris</code> utility.
Chapter 2	Remote Installation Services Setup Preparation
	Describes the knowledge, information, and tasks required before you set up the remote installation environment.
Chapter 3	Server Setup and Maintenance
	Describes how to install software into a remote installation environment and how to manage client information.

Related Documentation

The following list suggests the order in which you should read the related documentation:

1. **Hardware documentation**

You should have on hand the hardware documentation associated with your processor, particularly the Owner's Manual. These manuals show you how to set up the processor and its additional devices. These manuals also supply valuable troubleshooting guidelines.

2. **Release Notes**

Before beginning the installation, you should read the current version of the *Release Notes*.

3. **Guide to Server Setup**

This guide contains information about setting up the remote installation environment, and supported software subset information.

4. **System and network management guides**

Read the appropriate system and network management guides to help you prepare to install the remote installation environment.

Conventions

The following conventions are used in this manual:

A number sign is the default superuser prompt.

>>>
CPUnn>>> The console subsystem prompt is two right angle brackets on RISC systems, or three right angle brackets on VAX systems. On a system with more than one central processing unit (CPU), the prompt displays two numbers: the number of the CPU, and the number of the processor slot containing the board for that CPU.

user input This bold typeface is used in interactive examples to indicate typed user input.

system output This typeface is used in interactive examples to indicate system output and also in code examples and other screen displays. In text, this typeface is used to indicate the exact name of a command, option, partition, pathname, directory, or file.

.
.
. A vertical ellipsis indicates that a portion of an example that would normally be present is not shown.

cat(1) Cross-references to the *ULTRIX Reference Pages* include the appropriate section number in parentheses. For example, a reference to **cat(1)** indicates that you can find the material on the **cat** command in Section 1 of the reference pages.

RETURN

This symbol is used in examples to indicate that you must press the named key on the keyboard.

Mbyte

Throughout the text, the abbreviation Mbyte is used for megabyte. One megabyte equals 1,048,576 bytes.

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This chapter presents an overview of the remote installation services and introduces the remote installation services utility, `ris`.

To understand remote installation services, you must be familiar with:

- The remote installation environment
- The remote installation environment directories
- Software products and software subsets

The following components make up a remote installation environment:

- A server

The server can be any Digital supported processor. The software subset containing support for the maintenance operations protocol, MOP, must be installed in order for your system to be used as a server.

A server processor with either RISC or VAX architecture can serve both RISC and VAX clients.

- A distribution device on the server

The distribution device could be an MT9 tape drive, a TK50 tape drive, a TK70 tape drive, or a CDROM optical disc drive. You use the distribution device to transfer the software subsets for one or more specific products and architectures to the disk on the server that contains the remote installation environment. Then, registered clients can access the software.

- A system disk

The system disk associated with the server contains the software subsets for the products you install.

- The Ethernet

You must set up the server and all client processors as hosts on the Ethernet. Clients use the Ethernet to access the remote installation environment.

- Clients

Clients are members of the MicroVAX, VAXstation, DECstation, and DECsystem series of processors. Users do not load any media on the client processor to install software products. Instead, they type a command and the installation software transfers the software subsets residing on the server's remote installation environment over the network to their system disks.

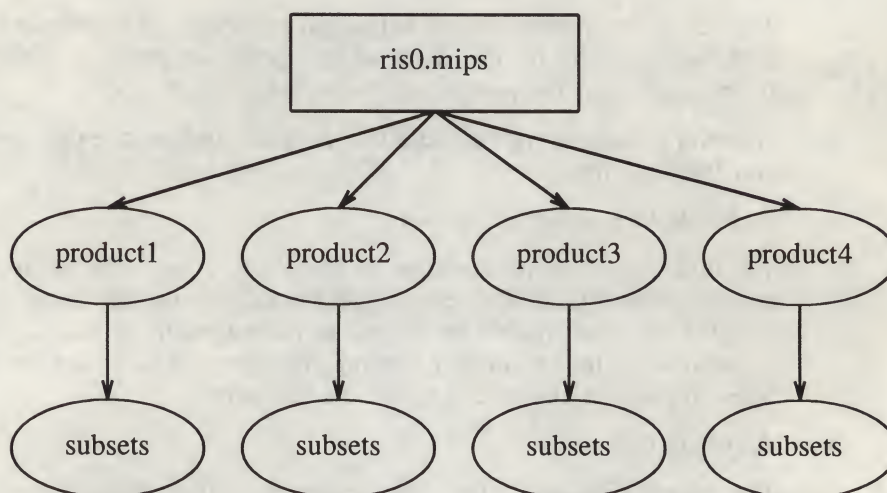
1.1 Directories

When you install an ULTRIX operating system, the installation software creates the directory, `/var/adm/ris`, that is necessary for `ris`.

When you install the first product to `/var/adm/ris`, the `ris` utility creates a remote installation services environment compatible with the architecture of the clients who will install the software over the network. The environment is called either `ris0.mips` or `ris0.vax`. Each time you install the first product to a new environment, `ris` creates another `risn.vax` or `risn.mips`. The letter *n* represents the sequential number `ris` assigns to each environment for each architecture when it is created. The environments `ris0.mips` and `ris0.vax` are used in examples throughout this guide.

Each environment contains one or more ULTRIX software products. The software subsets for each product reside in a subdirectory of that product's directory. Clients registered for an environment install software over the network to their processors. Figure 1-1 shows the directory structure of a remote installation environment.

Figure 1-1: Remote Installation Environment Directory Structure



1.1.1 Software Products and Software Subsets

A software product consists of one or more software subsets. A software subset is a collection of executable files and data files needed to perform a specific function or to provide a particular class of services for a specific product.

You can install any software product from media that is compatible with the `setld` utility. You can set up a remote installation environment on any processor supported by the installed version of the ULTRIX operating system. However, you can install software subsets from the remote installation environment only if your processor is a member of the MicroVAX, the VAXstation, DECstation, or the DECsystem series of processors.

1.2 Remote Installation Services Utility

You use the Remote Installation Services utility, `ris`, to set up the remote installation environment and register remote installation services clients. You also use the `ris` utility to manage your client processors. See `ris(8)` in the *ULTRIX Reference Pages* for a summary of the `ris` functionality.

1. Introduction

The purpose of this study is to investigate the effects of various factors on the performance of a system. The study is organized as follows: Section 2 describes the system and the factors being investigated. Section 3 presents the experimental design and the results of the experiments. Section 4 discusses the implications of the results and provides conclusions.

This chapter describes how to prepare to set up your remote installation environment. The chapter describes how to:

- Gather prerequisite information.
- Complete prerequisite tasks.

2.1 Gathering Prerequisite Information

As the system manager at the server, you should:

- Know your superuser password.
- Make sure that the file system in which the remote installation environment will reside has enough space to accommodate the software subsets for the products you want to install. See the documentation supplied with your product to learn the sizes of its software subsets.
- Make sure that your clients are licensed for all the software that they access in the remote installation environment.
- Understand that the more users who access the remote installation environment at the same time, the slower the system will run.
- Let your users know when you have finished setting up the remote installation environment, so that they can use it to install the software subsets for a specific product over the network. Tell your users to read the *Basic Installation Guide* when they want to perform an installation using the remote installation environment. Tell your users to read the *Advanced Installation Guide* as well, when they want to perform an advanced installation using the remote installation environment.
- Tell your users to read the `setld(8)` manual pages in the *ULTRIX Reference Pages*. They can use `setld` to add and delete software subsets. Proper use of `setld` will help manage disk space.

2.2 Completing Prerequisite Tasks

Before you set up the remote installation environment, you should complete the tasks described in this section:

- Install an ULTRIX operating system on the server.
- Set up a local area network.
- Obtain the host name for each client processor.
- Find out whether the client is a RISC or a VAX processor

- Register each client's host name and Internet Protocol (IP) with the appropriate naming service servers files.
- Obtain the client processor's hardware Ethernet address.
- Identify the distribution media.
- Obtain the full pathname of the device special file name or mount point for the distribution media.

2.2.1 Installing an ULTRIX Operating System on the Server

When you install an ULTRIX operating system, you do not have to choose the advanced installation option. However, the advanced installation lets you specify where you want to allocate the `/usr` file system and whether you want to allocate the `var` area as a directory under the `/usr` file system, or as a separate `/var` file system.

The remote installation environment is located in the `var` area. The remote installation environment significantly affects the size of `/usr`, if you allocate the `/var` area as a directory under `/usr`. Be sure you have enough space for the subsets you want to install. If you want more space, you can mount another file system under the `/var/adm/ris` directory before you set up your first remote installation environment. See the documentation provided with each product to find out the subset sizes.

This guide assumes that you allocated the `var` area as a directory under the `/usr` file system. The *Basic Installation Guide* explains how to install an ULTRIX operating system. The *Advanced Installation Guide* tells you how to perform an advanced installation. It also provides a table that lists supported software subset sizes.

The subset containing the maintenance operations protocol, MOP, must be installed on a server.

To load the subset containing MOP, either perform an advanced installation or use the `setld` command after the basic installation is complete. For example:

```
# setld -a /dev/rmt0h ULTMOP400
```

For more information, refer to `setld(8)` in the *ULTRIX Reference Pages*.

2.2.2 Setting Up a Local Area Network

You must connect the `ris` server and all of your client processors to the Ethernet. See the *Introduction to Networking and Distributed System Services* for instructions on how to set up a local area network (LAN).

2.2.3 Obtaining Clients' Host Names

The setup procedure requests the host name for each client processor that will use the remote installation environment. You specified this host name when you set up the LAN. When a client installs the software subsets for a product from the remote installation environment, the installation software displays the client's host name. The host name is equivalent to the system name discussed in the *Basic Installation Guide*.

2.2.4 Finding Out Whether the Client is a RISC or a VAX Processor

Find out whether the client is a RISC or a VAX processor so that you can decide from which environment to serve the client.

2.2.5 Registering Clients' Host Names and IP Addresses with Servers

If the host system is served by any of the following naming services,

`/etc/hosts`

Berkeley Internet Name Domain (BIND)

Yellow Pages (YP)

check with your site administrator to be sure that your clients are registered with the appropriate naming service servers.

You automatically place each client processor's host name and Internet Protocol (IP) address in the `/etc/hosts` file when you initially set up your LAN using the `netsetup` utility. The `netsetup` utility is described in the *Introduction to Networking and Distributed System Services*.

You can also place the host name and IP address in the `/etc/hosts` file by using a text editor, such as `vi`. The host name and IP address for each client processor must be unique.

See the *Guide to the Yellow Pages Service* for information about the Yellow Pages (YP) service. See the *Guide to the BIND/Hesiod Service* for information about Berkeley Internet Name Domain (BIND) server.

2.2.6 Obtaining the Hardware Ethernet Address

See the *Guide to Ethernet Communications Servers* for information about obtaining the hardware Ethernet address for each client processor.

2.2.7 Identifying the Distribution Media

See the bill of materials for the distribution media types and associated labels for your products.

2.2.8 Obtaining the Device Special File Name or Mount Point

Obtain the full path for the device special file name or mount point associated with your software distribution media. The device special file name points to the device on which you mount the media containing the software subsets.

Table 2-1 lists possible distribution media and, where applicable, the device special file name for each. The first column lists the distribution media type, the second column lists the full pathname for the device special file or mount point, and the last column contains the Digital name for the distribution media.

The letter *n* in the device special file name represents the unit number of the distribution device. For example, if the distribution device is a TU81 unit 0, then the device special file name is `/dev/rmt01`.

Table 2-1: Device Special File Names

Media Type	Device Special File Name	Digital Name
TK50 tape cartridge	/dev/rmt <i>n</i>	TK50, TK70, TZ30
9-track magnetic tape	/dev/rmt <i>n</i>	TS05, TU80 TU45, TE16 TU77
	/dev/rmt <i>n</i>	TA78, TA79, TA81 TU81, TU81E TU78, TU79
CDROM optical disc	/dev/rzn	RRD40

This chapter describes the tasks you perform to set up and maintain the remote installation environment. The instructions tell you how to perform the following tasks:

- Establish a new remote installation environment.
- Add a client.
- Remove a client.
- Show products in remote installation environments.
- Modify a client.
- Use the `ris` utility from the command line.
- Use the `ris` database to manage multiple clients.

Be sure you have read Chapter 1 before starting to set up your remote installation environment.

3.1 Establishing a New Remote Installation Environment

This section contains instructions for establishing a new remote installation environment. The sample sessions that follow describe how you would install the first product to a new environment, `ris0.mips`, then install an additional product to that environment.

3.1.1 Installing the First Product into a New Remote Installation Environment

The sample session that follows describes how to install all the ULTRIX software subsets into one area, `ris0.mips`, of a remote installation environment. You would perform this procedure again to set up multiple `risn.mips` or `risn.vax` areas that contain different software products. For example, the second set of ULTRIX software subsets might be installed in `ris0.vax`.

1. Log in and become the superuser.
2. Type the following command at the system prompt to invoke the `ris` utility:

```
# /etc/ris
```
3. Select the Install Software option from the `ris` menu.

REMOTE INSTALLATION SERVICES (RIS) UTILITY MENU

- a - Add Client
- r - Remove Client
- s - Show Products in Remote Installation Environments
- m - Modify Client

i - Install Software
e - Exit

Type your choice: i

4. A message appears describing the software installation options available followed by a menu. Choose option 1:

RIS Software Installation Menu

1 Establish a New Area
2 Add Software to Existing Area
3 Return to Previous Menu

Enter your choice: 1

5. A message like the following appears:

You have chosen to install the first product to a new remote installation environment.

6. A prompt asks for the full pathname of the device special file name or mount point for the distribution media.

Enter the device special file name or mount point of your distribution media. See the worksheet you filled out in Chapter 2 for the correct entry.

The following example shows how to mount the 9-track magnetic tape labeled ULTRIX V4.0/ULTRIX WS V4.0 SUPPORTED (RISC) #1 on a TU81 tape drive, unit 0:

Enter the device special file name or the path of the directory where the software is located, for example, /dev/rmt0h: **/dev/rmt01**

7. A menu appears listing the mandatory and optional subsets that you can select.
8. After you enter your selections, you are prompted for confirmation. If you are installing from MT9 tapes, you are prompted to remove Volume 1 and insert Volume 2 at the appropriate time.
9. When you confirm your selection, the subsets are installed. A message like the following appears when the installation is complete:

Media extraction complete.

The `ris` utility loads the software subsets for the specified product. When the product has been installed, a message appears giving the name of the remote installation environment, for example:

The new environment is in `/var/adm/ris/ris0.mips`.

The `ris` main menu appears.

3.1.2 Adding a Product to an Existing Remote Installation Environment

The sample session that follows describes how to add the ULTRIX Worksystem Software product to `ris0.mips`.

1. Choose the `Install Software` option again.
2. Choose option 2, `Add Software to Existing Area`.

3. A list of available environments appears from which you might select `ris0.mips`:

You have chosen to add a new product into an existing environment.

Select the remote installation environment:

- ```
1 /var/adm/ris/ris0.mips
 ULTRIX V4.0/ULTRIX WS V4.0 MANDATORY SUPPORTED (RISC)

2 /var/adm/ris/ris0.vax
 ULTRIX V4.0/ULTRIX WS V4.0 SUPPORTED (VAX)
```

Enter your choice: **1**

4. You are prompted for the device special file name or mount point.
5. A menu appears listing the mandatory and optional subsets that you can select.
6. After you enter your selections, you are prompted for confirmation. If you are installing from MT9 tapes, you are prompted to remove Volume 1 and insert Volume 2 at the appropriate time.
7. When you confirm your selection, the subsets are installed. A message like the following appears when the installation is complete:

Media extraction complete.

The `ris` main menu appears.

## 3.2 Adding a Client

Use the following procedure to add a client processor:

1. Log in and become the superuser.
2. Type the following command at the system prompt to invoke the `ris` utility:  
**# /etc/ris**
3. Select the Add Client Processor option from the menu that appears by typing **a**:

REMOTE INSTALLATION SERVICES (RIS) UTILITY MENU

- ```
a - Add Client
r - Remove Client
s - Show Products in Remote Installation Environments
m - Modify Client
i - Install Software
e - Exit
```

Enter your choice: **a**

4. A message appears indicating that you have chosen to add a client processor. The message also supplies some additional information.
5. A prompt asks if you want to continue with the add client processor procedure.
6. After you confirm that you want to continue, a prompt asks you to enter the client's host name.

Note

For registration, the MOP protocol and DECnet/ULTRIX software recognize only six characters for the host name. A host name can contain more than six characters, but the first six characters must be unique. The name must contain alphanumeric characters only and be entered in lower case, with the initial character an alphabet character.

Enter the client's host name. For example:

Enter the client processor's host name: **bergal**

If the client processor's host name has not been registered with the appropriate naming service servers, the **ris** utility displays an appropriate error message and repeats the prompt.

7. The next prompt asks you to type the hardware Ethernet address for the client.

In this example, the system manager specifies the hardware Ethernet address for the client **bergal**:

Enter the client processor's hardware Ethernet address, for example, 08-00-2f-03-f5-08: **08-00-2B-03-05-8B**

If you do not enter the address in the correct format, the **ris** utility displays an appropriate error message and repeats the prompt.

- 8.

The **ris** utility displays the prompts asking you to select the environment for which the client is to be registered. For example:

Select the remote installation environment to which this client is to be added:

```
1 /var/adm/ris/ris0.mips
   ULTRIX V4.0/ULTRIX WS V4.0 SUPPORTED (RISC)
```

```
2 /var/adm/ris/ris0.vax
   ULTRIX V4.0/ULTRIX WS V4.0 SUPPORTED (VAX)
```

Enter your choice []:

9. A prompt appears asking you to select the products this client can install. For example, if you chose the **ris0.mips** environment, the following might appear:

Select one or more products for the client to install from /var/adm/ris/ris0.mips:

Product	Description
1	ULTRIX 4.0/ULTRIX WS V4.0 SUPPORTED (RISC)

Enter your choice, for example, 1 2:

After you make your selections, a message appears showing your choice and requesting confirmation. For example:

You chose the following products:

```
1 ULTRIX 4.0/ULTRIX WS V4.0 SUPPORTED (RISC)
```


Is that correct (y/n)? [y]:

10. When you confirm your choice, a message similar to the following appears:
bergal has been added.

3.3 Removing a Client

To remove a client:

1. Log in and become the superuser.
2. Type the following command at the system prompt to invoke the `ris` utility:

```
# /etc/ris
```

A menu like the following appears:

3. Invoke the `ris` utility and select the Remove Client option by typing `r`:

```
REMOTE INSTALLATION SERVICES (RIS) UTILITY MENU
```

```
a - Add Client
r - Remove Client
s - Show Products in Remote Installation Environments
m - Modify Client
i - Install Software
e - Exit
```

Enter your choice: `r`

A message appears indicating that you have chosen to remove a client processor.

4. A list of existing environments appears. Select the environment you want.
5. A list of clients registered for that environment appears.
6. A prompt appears asking you to specify the name of the client that you want to remove. In the following example, the system manager removes the client called `profun`.

```
You have chosen to remove a client from the remote installation services.
Type the name of the client processor you want to
remove: profun
```

If you type an invalid name, an appropriate error message appears.

After you specify a valid client processor, the `ris` utility prompts for verification. For example:

```
Remove profun? (y/n) [n]: y
```

After you specify a valid client processor, the `ris` utility deletes it and returns you to the system prompt.

3.4 Showing Products in Remote Installation Environments

You can view the current products in a remote installation environment by using the following procedure:

1. Invoke the `ris` utility and select the Show Products in Remote Installation Environments option by typing `s`.

REMOTE INSTALLATION SERVICES (RIS) UTILITY MENU

```
a - Add Client
r - Remove Client
s - Show Products in Remote Installation Environments
m - Modify Client
i - Install Software
e - Exit
```

Enter your choice: `s`

2. A display similar to this appears:

Show Products in Remote Installation Environments:

```
1 ris0.mips
   ULTRIX Worksystem Software V4.0 (RISC)
```

3.5 Modifying a Client

You can use the Modify Client option to change a client processors's hardware Ethernet address and to change the products the client can install over the network.

A summary of the procedure for modifying a client follows:

1. Invoke the `ris` utility and select the Modify Client option by typing `m`:

REMOTE INSTALLATION SERVICES (RIS) UTILITY MENU

```
a - Add Client
r - Remove Client
s - Show Products in Remote Installation Environments
m - Modify Client
i - Install Software
e - Exit
```

Enter your choice: `m`

2. A list of clients available for modification appears, followed by a prompt to enter the client's hostname.
3. A prompt appears asking you to type in the client's hardware Ethernet address.
4. A list of the environments available and the products in each appears, with a prompt for you to select an environment for the client.
5. A list of products in the environment you selected appears, with a prompt for you to choose the products the client can install from that environment.
6. After you select the products the client can install and confirm your choice, a message appears saying that the client has been modified.

3.6 Using `ris` from the Command Line

You can use the `ris` utility from the command line to manage clients. This section includes the syntax of the `ris` utility commands with an example for each where appropriate.

The syntax of the command to add a client follows:

```
/etc/ris -a <clientname> -h <Ethernet_address> -p path,product[,product]
```

The following command would add client `bergal` and allow that client to install a product over the network:

```
# /etc/ris -a bergal -h 08-00-2B-03-05-8B -p ris0.mips,product_1
```

The syntax of the command to remove a client follows:

```
/etc/ris -r <clientname>
```

The following command would remove client `bergal`:

```
# /etc/ris -r bergal
```

The syntax of the command to show products in a remote installation environment follows:

```
/etc/ris -s
```

For example, if you type the following command:

```
# /etc/ris -s
```

A display similar to this appears:

Show Products in Remote Installation Environments:

```
1  ris0.mips
    ULTRIX Worksystem Software V4.0 (RISC)
```

The syntax of the command to modify a client follows:

```
/etc/ris -a <clientname> [-h <Ethernet_address>] [-p <path,product,product>]
```

The following command would modify client `bergal` and allow that client to install a product over the network:

```
# /etc/ris -m bergal -p ris0.mips,product_2
```

3.7 Using the ris Database to Manage Multiple Clients

The `ris` utility generates a database file automatically when you register the first client for the first remote installation environment. The pathname for the file is `/var/adm/ris/clients/risdb`.

Every time you add, delete, or modify a remote installation services client using the `ris` utility interactively, the database file is updated. The database file has the following format:

```
hostname:Ethernet_address:path,product[,product]
```

For example, the database file entry for `bergal` might look like the following:

```
bergal:08-00-2B-03-05-8B:ris0.mips,product_1
```

3.7.1 Adding Multiple Clients

You can edit the `/var/adm/ris/clients/risdb` file to add a group of clients, then use a `ris` command line to add the clients.

In the example that follows, the system manager adds a group of four remote installation services clients, after editing `/var/adm/ris/clients/risdb`.

The file contains the following entries before editing:

```
bergal:08-00-2B-03-05-8B:ris0.mips,product_1,product_2,product_3
erlang:08-00-6A-03-05-2B:ris0.mips,product_1
mostro:08-00-2B-06-05-8B:ris0.vax,product_1,product_2
noturn:08-00-2B-03-04-7B:ris0.mips,product_1
profun:08-00-2B-03-09-8B:ris0.vax,product_1
```

The system manager uses a text editor to add entries to the file, for example:

```
bergal:08-00-2B-03-05-8B:ris0.mips,product_1,product_2,product_3
erlang:08-00-6A-03-05-2B:ris0.mips,product_1
mostro:08-00-2B-06-05-8B:ris0.vax,product_1,product_2
noturn:08-00-2B-03-04-7B:ris0.mips,product_1
profun:08-00-2B-03-09-8B:ris0.vax,product_1
extra:08-00-2B-03-06-3B:ris0.mips,product_1
miler:08-00-6A-03-07-5B:ris0.mips,product_1,product_2
pastry:08-00-2B-16-05-4B:ris0.vax,product_1,product_2,product_3
overly:08-00-4B-03-09-3B:ris0.vax,product_1
```

Then, the system manager enters a command like the following to register the group of clients:

```
# /etc/ris -a extra miler pastry overly
```

3.7.2 Removing Multiple Clients

You can also use a `ris` command line to remove a group of clients, for example:

```
# /etc/ris -r pastry overly profun
```


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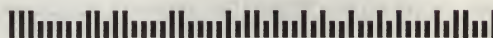
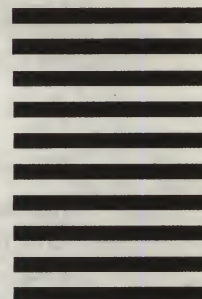
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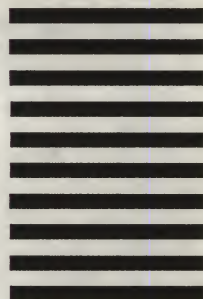
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